

REDWOOD LF ORDER NO. 95-110
UPDATED WASTE DISCHARGE REQUIREMENTS

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

ORDER NO. 95-110
UPDATED WASTE DISCHARGE REQUIREMENTS

REDWOOD LANDFILL, INC.,
CLASS III WASTE MANAGEMENT UNIT
NOVATO, MARIN COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board), finds that:

DISCHARGER & SITE IDENTIFICATION

1. Redwood Landfill, Inc., a wholly owned subsidiary of Sanifill, Inc., (hereinafter referred to as the discharger) owns and operates a Class III landfill on 420 acres in the southern area of the facility. The Redwood Landfill's property consists of a 180 acre Northern Area and a 420 acre Southern Area. The project site, as shown on Attachment A, which is incorporated herein and made a part of this Order, is located in northeast Marin County, approximately 4 miles north of the City of Novato and 7 miles southeast of the City of Petaluma. The landfill is east of State Highway 101 at 8950 Redwood Highway, between San Antonio Creek and the Northwestern Pacific Railroad tracks. The site is in Section 30, Township 4 North, Range 6 West of the Mount Diablo Baseline and Meridian (T4N, R6W, MDB&M) on the Petaluma River quadrangle. The site's latitude and longitude are 38°10'00"N and 122°33'30"W, respectively.
2. On July 14, 1994, Redwood Landfill, Inc submitted a Report of Waste Discharge (ROWD) for Redwood Landfill in accordance with the requirements of the California Code of Regulations (CCR), Title 23, Division 3, Chapter 15, Article 5 (hereinafter referred to as Article 5 of Chapter 15) and the provisions of Title 40, Part 258 of the Code of Federal Regulations (hereinafter referred to as Subtitle D).

PURPOSE OF UPDATE ORDER

3. This Order primarily updates the groundwater, surface water and leachate monitoring programs, approves vertical expansion of the landfill and incorporates limits for sludges and

petroleum contaminated soils acceptable for disposal into the landfill.

4. In November, 1994, Redwood Landfill submitted an amended Proposed Monitoring and Reporting Program. At that time RWQCB staff initiated review of the ROWD, Final EIR and amended Proposed Monitoring and Reporting Program for preparation of this Order.

SITE DESCRIPTION & HISTORY

5. The landfill has received waste since 1958 and is currently permitted to occupy 420 acres of the 600 acre site. The facility includes the following waste management units as defined by Title 23 CCR Sections 2530 through 2533:

- o Class III landfill that receives nonhazardous solid waste.
- o One lined surface impoundment that receives site generated leachate and contact water (11 acres).
- o One surface impoundment that receives non-contact surface water runoff only (18 acres).
- o Sludge processing areas that receive dewatered sludge from municipal wastewater treatment plants.

The landfill has an estimated lifetime of approximately 45 years and waste capacity of 19 million cubic yards as of July 1994. This landfill will continue to serve the longtime disposal needs of Marin County.

6. In the 1940s and 1950s the land was used for agricultural purposes. A perimeter levee, partially surrounding the landfill was constructed by using clamshell methods to dredge Bay mud from the sloughs and creek surrounding the site. The levee generally consisted of uncompacted silty and sandy clays containing organic materials. A portion of the old levee failed and was replaced with a new levee with a thickness of 13 to 21 feet between July and December 1990. The new levee was constructed with imported Bay mud containing minor amounts of sand and organic material.

Placement of refuse, which began in 1958 was performed using the area fill method or the trench fill method upto 1970. Only

the area fill method was used for placement of refuse from 1970 to date. When the existing Solid Waste Facility Permit was issued in 1978, approximately 150 acres of the 420 acre southern area had been filled with refuse to a depth of 10-30 feet. The remaining 270 acres were used for agriculture, infrastructure, storage, facility operations and maintenance structures.

The current facilities of the 420 acre Southern Area include the following:

- o Class III landfill (195 acres)
- o Sludge processing (105 acres)
- o Leachate impoundments (11 acres)
- o Stormwater retention basins (2 acres and 18 acres)
- o Administration and other ancillary uses (34 acres)
- o Interior levees, roads and drainage control facilities (15 acres)
- o Area outside the existing perimeter levee crest (40 acres)

7. The Board on February 20, 1985, adopted Order No. 85-15. Order 85-15 was amended on September 27, 1993, by Order No. 93-113, a general permit implementing the requirements of Subtitle D. This Order rescinds Order No. 85-15 and incorporates Order No. 93-113 in accordance with Chapter 15 and the provisions of Subtitle D.
8. Sections 2533(b), (c), (d) and (e) of Chapter 15 states that new Class III and existing Class II-2 shall be sited where soil characteristics, distance from groundwater, and other factors will ensure no impairment of beneficial uses of surface water or of groundwater beneath or adjacent to the landfill. The factors evaluated included:
 - a. size of the waste management unit.
 - b. permeability and transmissivity of underlying soils.
 - c. depth to groundwater and variations in depth to groundwater.
 - d. background quality of groundwater.
 - e. current and anticipated use of groundwater.
 - f. annual precipitation.

- g. potential for ground rupture.
 - h. potential for rapid geologic change.
9. The discharger in its Report of Waste Discharge proposed an 11 acre expansion of the area to receive waste. This Order does not authorize lateral expansion into areas not currently used for waste disposal because evaluation for lateral expansion requires sufficient information as described in Specification B.6.

WASTES AND THEIR CLASSIFICATION

10. The discharger proposes to discharge the following wastes to the landfill:
- a. Municipal solid waste - classified as " nonhazardous solid wastes or inert wastes" using the criteria set forth in Chapter 15.
 - b. Nonhazardous automobile shredder waste - analyzed in accordance with the RWQCB protocols acceptable to the Excutive Officer.
 - c. Asbestos - consistent with Title 22 of the Health and Safety Code (Section 25143.7).
 - d. Agricultural waste, dead animals, construction and demolition debris and industrial waste.
 - e. Nontypical Wastes: Sewage Sludge pursuant to Section 2523(c) of Chapter 15, incinerator ash, grit and grease, storm drain cleanings, nonhazardous holding tank pumpings, petroleum contaminated soil, treated wood, dredge and fill material and triple-rinsed chemical containers.
11. Subtitle D prohibits recirculation of leachate and gas condensate except where landfill units are equipped with composite liner systems and a leachate collection and recovery system that meets Subtitle D and Chapter 15 requirements.
12. The reuse of leachate for dust control on access roads and intermediate cover is permitted provided leachate is treated and/or confirmed to be "clean" (i.e., non detectable organics per EPA Method 8260 and lower than background inorganics).

GEOLOGY

13. The surface and subsurface geology of the site has been evaluated based on field mapping, literature review, geophysical surveys (seismic refraction and vertical electrical sounding) and review of geologic logs from well borings.
14. STRATIGRAPHY - The landfill subsurface is composed of three geologic units listed from deepest to shallowest below:
- o Franciscan bedrock
 - o Pleistocene alluvium
 - o Holocene bay mud containing sand/silty sand channel deposits.

Franciscan bedrock - The landfill is underlain by bedrock of the Franciscan Complex. The bedrock is exposed adjacent and west of the northern portion of the 420 acre Southern Area. Bedrock borings encountered very dark grey-brown mudstone/claystone, which is believed to be sheared shale and intensely fractured and deeply weathered sandstone, greywacke and greenstone.

Pleistocene alluvium - The bedrock is unconformably overlain by Pleistocene alluvium, however the alluvium is locally absent on buried bedrock ridges, where bedrock is directly overlain by the younger bay mud deposits. The alluvium locally consists of very stiff to hard sandy clay/clayey sand that contains laterally discontinuous lenses of coarse grained sand and gravel. The top and base of the alluvium locally consists of very stiff sandy clay or clayey sand that have a lower hydraulic conductivity than the sand and gravel lenses and therefore act as aquitards.

Holocene bay mud - The bay mud overlies Pleistocene alluvium and, in some locations, bedrock. The bay mud at the landfill consists of soft compressible fat clays (CH) and elastic silts (MH) that contain varying amounts of organic material and sand.

The thickness of the bay mud throughout the site varies from 5 to 56 feet. Locally, the bay mud unit contains sand and silty sand channel deposits. These channel deposits range from

less than a foot to several feet in thickness. These channel deposits represent areas of increased permeability and are likely preferential groundwater flow pathways.

15. STRUCTURE - The site lies within the northern California Coast Ranges Geomorphic Province. This Province consists of northwest trending mountain ranges, broad basins, and narrow valleys generally paralleling major geologic structures. Although there are no known active faults within a 10 mile radius of the site (defined as having evidence of movement in Holocene time and therefore within the last 11,000 years), some potentially active faults (evidence of movement within the last 2 to 3 million years) are present near the site. The major faults in this region are the San Andreas, Hayward, Healdsburg-Rogers Creek, Calaveras, Concord-Green Valley, Palo Colorado-San Georgian and Mount Burdell Faults. The Rogers Creek Fault is the nearest active Fault, located about 10 miles east of the site.

SURFACE WATER AND GROUNDWATER

16. SURFACE WATER - The site is surrounded by a complex network of natural and manmade surface water bodies that drain to the Petaluma River and flow into San Pablo Bay. These include the tidally influenced San Antonio Creek, Mud Slough, and the manmade West Slough which borders the eastern, western and northern margins of the site respectively. Another tidally influenced canal, located along the southern margin of the site, is informally known as the South Slough. These sloughs are separated from the site by a 4 mile long perimeter levee that ranges in elevation from 6 to 9 feet MSL. The top of the levee is approximately 10 to 15 feet wide and has inboard and outboard side slopes of approximately 2:1 (horizontal to vertical).
17. GROUNDWATER - Three hydrostratigraphic units were identified at the landfill: Bay Mud with sand/silty sand channel deposits, Pleistocene Alluvium, and Franciscan Bedrock. These three hydrostratigraphic units are not interconnected and also differ in their hydraulic properties.

The groundwater flow direction varies with each stratigraphic unit. Groundwater flow within the Bay Mud is upward toward the refuse in the center of the landfill due to refuse fill induced pore pressures and radially outward within the sand/silty sand unit along the landfill perimeter. The

hydraulic gradients within the Bay Mud varies from 0.002 ft/ft to 0.011 ft/ft at the perimeter wells. Slug testing conducted in 1992 (HLA 1992e) yielded hydraulic conductivities ranging from 4.3×10^{-6} cm/s to 9.2×10^{-7} cm/s for bay mud materials. Field testing performed in wells completed within the sand/silty sand channel deposit intervals yielded hydraulic conductivities ranging from 3.1×10^{-5} to 2.0×10^{-4} ft/min (HLA, 1994).

Based on these gradients and permeabilities, groundwater velocities for the two materials vary from about 0.0064 ft/yr in bay mud materials to 6.3 ft/yr in the sand/silty sand channels. Based on these estimates, groundwater flowing within the sand/silty sand channel zones will reach the relevant point of compliance 200 to 1,000 times earlier than groundwater travelling within the bay mud materials.

Water level elevations in the Pleistocene alluvium range from 4 to 8 feet MSL within the landfill footprint (HLA, 1994b). The alluvial groundwater exhibits confined conditions with vertically upward gradients relative to the bay mud groundwater zone. The direction of groundwater flow in the Pleistocene alluvium appears to be northwest (HLA, 1992). Field testing indicates that hydraulic conductivities range from 8.5×10^{-4} to 1.8×10^{-3} feet/min as estimated from constant-rate pumping and recovery tests (EMCON, 1989). Sand channel deposits within the bay mud respond to tidal influences many times more readily than the surrounding bay mud materials.

The Franciscan bedrock hydrostratigraphic unit is not monitored at the site, hence its hydraulic properties were not investigated. The results of a tidal study conducted by EMCON (1989B), indicate that groundwater in both the Bay mud and Pleistocene alluvium is affected by tidal fluctuations. Fluctuations of groundwater levels and flow in bay mud indicate limited connection of bay mud waters with the surrounding surface waters. Both the chemical and tidal response data indicate that hydraulic communication is limited to areas near to surface water.

18. GROUNDWATER DEGRADATION - Areas at greater risk for potential groundwater degradation and off-site contaminant migrations are the sand/silty sand channel deposits which are present within the Holocene bay mud stratigraphic unit.

- Landfill Novato, California. (HLA June 1992)
iii Leachate Management Plan, Redwood Landfill Novato,
California. (CH2M Hill, March 1992).

SLOPE STABILITY (Refer to Table 1, Slope Stability Analyses Summary)

22. As part of the geotechnical evaluation and design for the landfill, the discharger evaluated the static and seismic stability of the permanently exposed cut slopes, the toe berm and the final landfill slopes. A summary of the parameters used to evaluate slope stability is shown on Table 1.
23. STATIC SLOPE STABILITY - The static stability of the permanently exposed cut slopes, the toe berm and the final landfill slopes were analyzed using the following computer program:
- o TCON Version 4.97 - TCON computes consolidation settlements of soil (TAGA, 1991)
 - o TSTAB - TSTAB, analyzes the stability of slopes with circular slip surfaces using limit equilibrium methods. TSTAB was used to analyze slopes using Bishop's simplified Method (TAGA, 1984).
 - o PC STABL 5M - PC STABL 5M analyzes slope stability with circular and noncircular slip surfaces using limit equilibrium methods. PC STABL 5M analyzes slopes using Janbu's simplified method for noncircular slip surfaces (Purdue University, 1988).

The results indicate that the final slope has a minimum factor of Safety of approximately 1.5 and that the exterior slopes of the Redwood Landfill are adequately stable. The strength parameters and soil properties used are friction angle, cohesion and total unit weight. Board staff has reviewed the strength parameters and soil properties used by the discharger in the stability analysis and finds that they appear reasonable.

24. PSEUDO-STATIC STABILITY - A Pseudo-static stability was

19. BACKGROUND WATER QUALITY - As discussed in the approved Monitoring and Reporting Program (HLA 1994), groundwater and surface waters at the site are extremely mineralized under natural conditions. Typical values for total dissolved solids are reported to range from about 6,250 mg/l to as high as 88,000 mg/l in background groundwater of the Bay Mud materials. Concentrations of selected chemical parameters such as chloride, sodium, calcium, magnesium, and alkalinity have been determined to be major contributors of the elevated TDS concentrations. These waters are non-potable based on the parameter concentration ranges and the high degree of natural mineralization. Ground and surface water from most of the sampling locations at Redwood Landfill have pH values between 6.9 and 7.3. A maximum chloride concentration of 37,000 mg/l were observed in background bay mud materials.

Maximum concentrations of dissolved metals consistently detected are arsenic (0.65 mg/l), barium (0.96 mg/l), iron (7.2 mg/l), manganese (10.0 mg/l), and zinc (0.10 mg/l). The concentrations of these constituents and several other general water quality parameters do not meet drinking water standards under natural conditions. Previous studies indicate that on-site groundwater is naturally of poor quality. Throughout the San Francisco Bay area, the quality of groundwater in the Bay Mud is poor and does not meet state drinking water standards without treatment. The regionally poor quality of the Bay Mud groundwater is due to several factors including proximal saline ocean water influences; and the brackish waters associated with the deposition of Bay Muds in a marine or estuarine environment.

20. BENEFICIAL USES - The future beneficial uses of the groundwater in the alluvial deposits surrounding the Redwood Landfill are Industrial process supply. Beneficial uses of San Antonio Creek and the Mud Slough are estuarine habitat and wildlife habitat.
21. The discharger submitted the following reports which propose to construct and operate the landfill in accordance with the requirements of Chapter 15 and Subtitle D, and are hereby approved and incorporated into this order.
- i. Proposed Monitoring And Reporting Program Redwood Landfill, Inc. Novato, California. (HLA August 1994)
 - ii. Revised Site Development Plan, Volume I & II Redwood

performed to determine the yield acceleration for the slope as a function of the assumed value of shear strength for future refuse and calculated shear strength for bay mud, alluvium, old levee and new levee. The yield acceleration is defined as that pseudo-static coefficient corresponding to a factor of Safety equal to 1.0. The results of the yield acceleration values for Redwood Landfill vary between 0.064g and 0.08g. The computer codes TSTAB and PC STABL 5M were used to evaluate the dynamic stability of the landfill.

25. DYNAMIC STABILITY - Ground Response and Deformation Analysis: Chapter 15 requires that "Class III waste management units be designed to withstand the maximum probable earthquake without damage to the foundation or to the structures that control leachate, erosion or gas". HLA estimated maximum probable bedrock acceleration expected at the site due to earthquakes emanating from any of the nearby faults (i.e Healdsburg-Rogers Creek, San Andreas, Hayward, Calaveras Concord-Green Valley, Palo Colorado-San Gregorio and Mount Burdell faults). The results indicate that the Redwood Landfill shall withstand the maximum probable earthquake without damage to the foundation or to the structures which control leachate, surface drainage, erosion or gas. Board finds that the seismic slope stability analysis is acceptable.

DESIGN OF WASTE MANAGEMENT UNIT

26. Redwood landfill is underlain by the Bay mud and alluvial deposits. The southern portion of the landfill area within the present footprint is provided with clay liner systems but is not currently provided with an adequate leachate collection and removal system (LCRS). The discharger proposed a leachate collection and removal system along the perimeter of the entire landfill area as a necessary and acceptable means of containing contaminated groundwater onsite. (see Specification B.8).
27. The site design provides a drainage pattern that segregates run-on from offsite drainage areas, contact water runoff generated during site operations in the active landfill area and non-contact surface water runoff from the onsite drainage areas outside of the active landfill area.

Run-on to the facility from offsite drainage areas is controlled by a perimeter levee system that prevents flooding and inundation. Contact surface water runoff during site

operations in the active landfill area is collected by temporary earthen berms, sumps and conveyed by piping to the 11-acre leachate impoundment. Non-contact surface water runoff is discharged offsite pursuant to Redwood Landfill NPDES Permit.

28. New impoundments that receive and store nonhazardous sludges and alkaline material may be permitted provided they are constructed with a composite liner system and a LCRS that meets Chapter 15 requirements.
29. The Co-Composting operation areas using non-hazardous sludges may be permitted provided they are constructed with a composite liner/or existing clay liner system and a LCRS that meets Chapter 15 requirements.
30. The landfill gas collection system consists of a network of vertical extraction wells and horizontal collection trenches from which landfill gases are extracted and incinerated.
31. The discharger has submitted an approved Closure plan to this Board and to the California Integrated Waste Management Board. The Closure plan provides evidence of an irrevocable Closure Fund and means to ensure closure and postclosure maintenance of the waste management unit, pursuant to Section 2580(f) of Chapter 15 and Section 258.60, Subpart F of Subtitle D.
32. The Regional Board adopted a revised Water Quality Plan for the San Francisco Bay Basin in December, 17, 1986 and this Order implements the water quality objectives stated in that plan.

MONITORING PROGRAM

33. The discharger proposes Water Quality Protection Standards (WQPS) pursuant to Article 5, Section 2550.2. The proposed WQPS consists of five elements: (1) Monitoring points (2) Constituents of concern (3) Concentration limits (4) Points of Compliance and (5) Compliance period.
 - a. The discharger is permitted to install monitoring wells at appropriate locations as stated in Specifications B.9, B.14 and B.16.
 - b. Surface water monitoring is presently conducted under the requirements of the General Industrial Stormwater

Discharge Permit (NPDES).

- c. Unsaturated zone monitoring program is permitted where technically feasible, to satisfy the requirements of Article 5, Section 2550.7.
 - d. The discharger is authorized to analyze for the constituents of concern (COC's) and monitoring parameters as presented in Table A (Background Monitoring Parameters), Table B (Detection Monitoring Parameters) and Table C (Leachate Monitoring Parameters) of the Discharge Monitoring Program for Redwood Landfill.
 - e. A geotechnical monitoring program is permitted as prescribed in Specification B.10.
34. Federal Regulations [40 Code of Federal Regulations (CFR) Parts 122, 123, and 124] require specific categories of industrial activities, including landfills, to obtain an NPDES permit for storm water discharges. The State Water Resources Control Board has issued a General Permit for Storm Water Discharges Associated with Industrial Activities (NPDES Permit No. CAS000001). This facility is subject to these requirements. Pursuant to the Stormwater Discharge Program, this facility is required to submit a Notice of Intent for coverage under the General Permit; to prepare and implement a monitoring program; and to submit an annual report. Compliance with the monitoring and reporting requirements of this Order are intended to assure compliance with the requirements of the General Permit.

CALIFORNIA ENVIRONMENTAL QUALITY ACT.

35. The Marin County Office of Environmental Health Services, as lead agency, certified a final Environmental Impact Report on May 24, 1994, in accordance with California Environmental Quality Act (Public Resources Code Section 21000 et. seq.).
36. The final Environmental Impact Report found that the proposed landfill and landfill activity, as approved by the County, could cause significant effect on water quality and may degrade the water quality unless appropriate mitigation measures are taken. Unmitigated, the potential impact to the water quality could occur as a result of:

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- o Landfill slope displacement due to earthquake damage, gravity, settlement or flooding.
- o Landfill instability due to the underlying bay mud's insufficient strength to support the proposed vertical expansion of the landfill.
- o Settlement of refuse and underlying bay mud due to height of refuse, thickness of bay mud and the staging of refuse placement.
- o Erosion of cover materials and/or refuse due to storm water runoff.
- o Migration of landfill leachate to off site surface water and groundwater due to the existing leachate mound or increase in leachate generation by expansion of the landfill.
- o Surface runoff or leachate from active fill area or the co-composting (composting using sludges), alkaline stabilization of non-hazardous sludges and wood shredding areas could carry nutrients, heavy metals and organic chemicals into adjacent surface waters affecting beneficial uses.

37. In the Redwood Landfill FEIR, the following mitigation measures were recommended for the protection of surface water and groundwater quality:

- o Design and operation of the sanitary landfill based on natural geologic conditions and in accordance with Article 5, Chapter 15 and Subtitle D to minimize leachate production, and minimize adverse impacts on surface water and groundwater quality.
- o Geotechnical monitoring to estimate deformation rates and determine whether further stabilizing actions are needed.
- o A composite liner system that meets the requirements of Subtitle D underlying all areas at the landfill site beyond the present limits of waste placement.
- o Mitigation measures recommended in the water resources section of the FEIR. These include the following four activities to minimize production of leachate and promote reuse of collected leachate, after treatment to "clean standards": (1) place well compacted, vegetation free intermediate cover; (2) grade intermediate cover to drain freely to a storm water runoff system; (3) install a perimeter leachate collection and removal system around

- the landfill to collect mounded leachate;(4) use as much collected leachate as possible, after treatment to "clean standards", for dust control on interior access roads and intermediate cover.
- o Groundwater monitoring to monitor the integrity of the containment structures, leachate collection system and control facilities.
 - o Mitigation measures to minimize the production of contact water and eliminate off-site discharges. The following practices are to be used to manage contact water runoff from the active landfill and sludge processing areas: suspend sludge processing during wet weather to as small an area as possible; confine the active landfill area during the wet, winter season to as small an area as possible; design and construct drainage facilities to collect and convey contact water runoff to the 11-acre leachate impoundment and 18-acre runoff impoundment as appropriate. Conveyance facilities for contact and non-contact storm runoff include berms, dikes, ditches, pipes and flap gates. Sediment detention devices include silt traps, silt fences, and siltation basins.
 - o Mitigation measures to minimize erosion of cover materials include distribution of non-contact water runoff downslope from landfill as sheet flow at non erosive velocities; exterior final and intermediate slopes are to be graded to no less than 3%; benches ranging in width from 25 to 100 feet are incorporated every 15 vertical feet; diversion berms and perimeter ditches are constructed along the upslope extent of the working face of the landfill to direct storm water runoff away from the operation; and the final cover is revegetated after the landfill is closed.
 - o Compliance with the regulations and standards contained in Subtitle D, Chapter 15 and waste discharge requirements adopted by the Board.
38. The Board has considered the Redwood Landfill FEIR and the mitigation measures described therein relating to the protection of surface water and groundwater quality. The Board finds that compliance with the construction, operation and monitoring requirements of this Order will protect water quality from potential discharge from the landfill.

39. The Board notified the discharger and interested agencies and persons of its intent to issue waste discharge requirements for the discharger and has provided them with an opportunity for a public hearing and an opportunity to submit their written views and recommendations.
40. The Board, in public meeting heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED that the discharger, its agents, successors and assigns shall meet the applicable provisions contained in Title 23, Division 3, Chapter 15, and Division 7 of California Water Code, and shall also comply with the following:

A. PROHIBITIONS

1. The disposal of waste shall not create a pollution or nuisance as defined in Section 13050(1) and (m) of the California Water Code.
2. Waste shall not be placed in or allowed to contact ponded water from any source whatsoever.
3. Waste shall not be disposed of in any position where it can be carried from the disposal site and discharged into waters of the State or of the United States.
4. Leachate from waste and ponded water containing leachate or in contact with solid wastes shall not be discharged to waters of the State or of the United States.
5. Hazardous wastes as defined in Sections 2521 and 2522 of Chapter 15, except for waste that is hazardous due only to its friable asbestos content, shall not be deposited at the site.
6. **Designated wastes** as defined in Sections 2521 and 2522 of Chapter 15, except for waste that is hazardous due only to its friable asbestos content, **shall not be deposited at the site.**
7. High-moisture-content waste (those containing less than 50% solids) other than water treatment and waste-water treatment sludges shall not be discharged into the disposal area without prior approval by the Executive Officer. Such approval shall be granted only if there is

adequate moisture holding capacity in the landfill based upon mass balances and previous monitoring of the relevant leachate control facility. A minimum solid-to-liquids ratio of 5:1 by weight must be maintained for the disposal operation overall. Furthermore, sludges shall not be discharged into the disposal area unless they contain at least 20% solids if primary sludges, or at least 15% solids if secondary sludge, mixtures of primary and secondary sludges, or water treatment sludge.

8. The discharger, or any future owner or operator of the site, shall not cause the following conditions to exist in waters of the State at any place outside the waste management facility:

- a. Surface Waters

1. Floating, suspended, or deposited macroscopic particulate matter or foam.
2. Bottom deposits or aquatic growths.
3. Alteration of temperature, turbidity, or apparent color beyond natural background levels.
4. Visible, floating, suspended or deposited oil or other products of petroleum origin.
5. Toxic or other deleterious substances to be present in concentrations or quantities which may cause deleterious effects on aquatic biota, wildlife or waterfowl, or which render any of this unfit for human consumption either at levels created in the receiving waters or as a result of biological concentrations.

- b. Groundwater

1. The groundwater shall not be degraded as a result of the solid waste disposal operation.
9. Leachate from wastes and ponded water containing leachate or in contact with solid waste shall not be discharged to waters of the State or the United States.

B. SPECIFICATIONS

1. All reports pursuant to this order shall be prepared under the supervision of a registered civil engineer, California registered geologist or certified engineering geologist.
2. Water used during disposal operations shall be limited to a minimal amount necessary for construction, dust control and fire suppression.
3. The site shall be protected from any washout or erosion of wastes or covering material and from inundation which could occur as a result of a 100 year 24 hour precipitation event, or as the result of flooding with a return frequency of 100 years.
4. Hazardous wastes and Infectious wastes shall not be disposed of at this landfill. Non-hazardous, Inert wastes and Asbestos may be disposed of at this landfill provided that all regulations and provisions of the California Integrated Waste Management Board, California Department of Toxic Substance Control, local health agencies and County Land Use Permit requirements are complied with.
5. Sludges and petroleum contaminated soils are acceptable for disposal into the landfill provided that concentrations do not exceed the acceptance limit for the constituents identified below:

Parameter	Acceptance limit(mg/l)
Benzene	0.015
Dichloromethane	0.075
Diesel (TPH)	0.15
Ethylbenzene	0.45
MEK	3.0
PCB's	0.0075
Perchloroethylene (PCE)	0.075
Phenol	0.075
Styrene	0.15
Toluene	0.6
Trichloroethylene	0.075
Vinyl Chloride	0.03
Xylenes	0.3
Aluminum	10
Arsenic	0.25

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Barium	50
Berellium	0.05
Cadmium	0.25
Chloride	12500
Chromium, VI	2.5
Cobalt	2.5
Copper	10
Lead	0.75
Manganese	2.5
Mercury	0.0006
Molybdenum	0.5
Nickel	5
Nitrate	500
Nitrite	50
Selenium	0.5
Silver	2.5
Sulfate	12500
Thallium	0.1
Vanadium	1
Zinc	100

Acceptance limit is defined as the highest average concentration for each constituent of concern within a waste per disposal event. Event is the disposal of a specified quantity of waste; ongoing, long term disposal of a waste stream would consist of a series of individual events.

6. Lateral landfill expansion may be considered upon submittal of a Report of Waste Discharge, along with the appropriate fees, which includes technical designs for a composite liner and LCRS and demonstrates that the facility meets the siting criteria for a Class III municipal solid waste facility in compliance with requirements of Subtitle D and Chapter 15.
7. Surface drainage from tributary areas, and internal site drainage from surface or subsurface sources, shall not contact or percolate through wastes during disposal operation or during the life of the site.
8. A perimeter leachate collection and removal system shall be constructed as described in the Redwood Landfill's Leachate Management Plan Report submitted March, 1992.

Measures shall be taken to ensure that leachate in the leachate collection system can flow freely into the leachate collection sumps. Measures shall also be taken to assure that the leachate collection sumps and extraction wells will remain operational permanently.

9. Each monitoring well shall target only one hydrostratigraphic unit as the bay mud and the Pleistocene alluvium are not hydraulically connected. Existing wells that were screened in more than one hydrostratigraphic units, (e.g., wells P7B, P9B, P11B, P12B, P18B, P18C, P19B, P26) must be decommissioned and replaced since they could act as conduits for cross contamination between aquifers and do not meet the requirements for monitoring a specific hydrologic water bearing zone.
10. A geotechnical monitoring program shall be established to evaluate the performance of the landfill as construction proceeds. The purpose of the geotechnical monitoring program is to collect data on subsurface movement of the levee and exterior landfill slopes so that assumptions made during the stability analyses can be checked and to determine whether modifications to the fill sequencing plan are necessary.

Geotechnical monitoring reports shall be submitted for evaluation of landfill's performance as landfilling and construction proceeds.

11. A geologic map and or a geophysical map of the landfill shall be updated to delineate the sand lenses identified in the bay mud.
12. The discharger shall assure that the foundation of the site, the solid waste fill, and the structures which control leachate, surface drainage, erosion and gas for this site are constructed and maintained to withstand conditions generated during the maximum probable earthquake.
13. As portions of the landfill are closed, the exterior surfaces shall be graded to a minimum slope of three percent in order to promote lateral runoff of precipitation. In addition, all completed disposal areas shall be covered with a minimum of 4 feet of cover and

meet other applicable requirements as described in Article 8 of Chapter 15.

14. The discharger shall maintain and monitor the waste unit so as not to cause a statistically significant difference to exist between water quality parameters at the compliance points and the Water Quality Protection Standards (WQPS) as defined in Section 2550.2 of Article 5. The point of compliance as per Section 2550.5 Article 5 of Chapter 15 is a vertical surface located at the hydraulically downgradient limit of the waste management unit that extends through the uppermost aquifer underlying the unit.
15. The Regional Board shall be notified immediately in the event of a release of a constituent of concern beyond the Point of Compliance, the site begins a Compliance Period (Sect. 2550.6(a)). During the Compliance Period, the discharger shall perform an Assessment Monitoring Program and a Corrective Action Program.
16. The discharger shall install any reasonable additional groundwater and leachate monitoring devices required to fulfill the terms of any Discharge Monitoring Program issued by the Executive officer.
17. Interim cover shall be maintained over all waste, at all times, except for the active face area of the disposal operations and areas where additional solid waste will be deposited within 180 days or as provided for by the performance standards adopted by the California Integrated Waste Management Board.
18. Landfill gases shall be adequately vented, removed from the landfill, or otherwise controlled to minimize the danger of explosion, adverse health effects, nuisance conditions, or the impairment of beneficial uses of water due to migration through the vadose (unsaturated) zone.
19. The discharger shall maintain all devices or designed features, installed in accordance with this order such that they continue to operate as intended without interruption as provided for by the performance standards adopted by the California Integrated Waste Management Board.

20. The discharger shall provide a minimum of two surveyed permanent monuments near the landfill from which the location and elevation of wastes, containment structures, and monitoring facilities can be determined throughout the operation and post-closure maintenance period. These monuments shall be installed by a licensed land surveyor or registered civil engineer.
21. The Regional Board shall be notified immediately of any failure occurring in the waste management unit. Any failure which threatens the integrity of containment features or the landfill shall be promptly corrected after approval of the method and schedule by the Executive officer.
22. The discharger shall notify the Regional Board at least 180 days prior to beginning any final closure activities. This notice shall include a statement that all activities will conform to the most recently approved closure plan and that the plan provides for site closure in compliance with all applicable regulations.
23. The discharger shall submit, within 90 days after the closure of any portion of the landfill, a closure certification report which documents that the area has been closed according to the requirements of this order and Chapter 15. The discharger shall certify under penalty of perjury that all closure activities were performed in accordance with the most recently approved closure plan as defined by California Integrated Waste Management Board and in accordance with all applicable regulations.
24. The discharger shall comply with all applicable provisions of Chapter 15 that are not specifically referred to in this Order.

C PROVISIONS

1. The discharger shall submit eight quarters (Discharge Monitoring Parameters) of monitoring data for new and existing wells. These data shall be submitted with reports for existing wells on a semi annual basis. Subsequent to eight quarters of data collection, wells

will be sampled and reported on a semi-annual basis. Background discharge monitoring for new wells will be conducted for the parameters listed in Table A. Samples collected from existing wells on a semi annual basis will be analyzed for parameters listed in Table B unless Discharge monitoring indicates that the monitoring parameter should be modified. In this case, parameters may be added or deleted from the Table B.

2. The discharger shall submit an updated geologic map as described in Specification B.11. after the construction of the perimeter leachate collection and recovery system.
3. The discharger shall submit a detailed Post Earthquake Inspection and Corrective Action Plan acceptable to the Executive officer to be implemented in the event of any earthquake generating ground shaking of Richter Magnitude 7 or greater at or within 30 miles of the landfill. The report shall describe the containment features, and groundwater monitoring and leachate control facilities potentially impacted by the static and seismic deformations of the landfill. The plan shall provide for reporting results of the post earthquake inspection to Board within 72 hours of the occurrence of the earthquake. Immediately after an earthquake event causing damage to the landfill structures, the corrective action plan shall be implemented and this Board shall be notified of any damage. The report shall be due within three months of adoption of this Order.

REPORT DUE DATE: 3 MONTHS OF ADOPTION OF THIS ORDER

4. All reports pursuant to these Provisions shall be prepared under the supervision of a registered civil engineer or California certified engineering geologist.
5. The discharger shall submit a Contingency Plan to be instituted in the event of a surface leak or spill from the leachate facilities. The discharger shall give immediate notification to the San Francisco Bay Regional Water Quality Control Board, the Local Enforcement Agency (LEA), and the California Department of Toxic Substances Control. The discharger shall initiate its contingency action plan to stop and contain the migration of pollutants to receiving waters. The report shall be due within three months of adoption of this Order.

REPORT DUE DATE: 3 MONTHS OF ADOPTION OF THIS ORDER

6. The discharger shall remove and relocate any wastes which are discharged at this site in violation of these requirements.
7. The discharger shall complete closure activities of each Municipal Solid Waste landfill unit and the final cover system in accordance with its "Closure Plan" and as may be amended and approved by the Executive Officer.
8. The discharger shall operate its Sludge Management Facility in accordance with its, "Sludge Management Plan" and as may be amended and approved by the Executive Officer.
9. The discharger shall file with the Regional Board Discharge Monitoring Reports performed according to any Discharge Monitoring Program issued by the Executive Officer.
10. The discharger shall file with this Board a report of any material change or proposed change in the character, location, or quantity of this waste discharge. For the purpose of these requirements, this includes any proposed change in the boundaries of the disposal area or the ownership of the disposal site.
11. The discharger shall immediately notify the Board of any flooding, equipment failure, slope failure, or other change in site conditions which could impair the integrity of waste or leachate containment facilities or precipitation and drainage control structures.

REPORT DUE DATE: IMMEDIATE

12. The discharger shall maintain a copy of this Order at the site so as to be available at all times to site operating personnel.
13. This Board considers the property owner and site operator to have continuing responsibility for correcting any problems which arise in the future as a result of this waste discharge or related operations.
14. The discharger shall permit the Regional Board or its authorized representative, upon presentation of

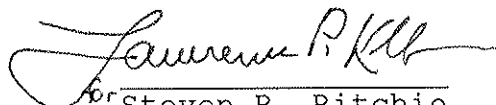
credentials:

- a. Immediate entry upon the premises on which wastes are located or in which any required records are kept.
 - b. Access to copy any records required to be kept under the terms and conditions of this order.
 - c. Inspection of any treatment equipment, monitoring equipment, or monitoring methods required by this order or by any other California State Agency.
 - d. Sampling of any discharge or groundwater governed by this order.
15. This Board's Order Nos. 85-15 is hereby rescinded.
 16. This requirement does not authorize commission of any act causing injury to the property of another or of the public; do not convey any property rights; do not remove liability under federal, state or local laws; and do not authorize the discharge of wastes without appropriate permits from other agencies or organizations.
 17. The discharger shall comply with all applicable items of the attached **"Standard Provisions and Reporting Requirements"** or any amendments thereafter.
 18. In the event of any change in control or ownership of land or waste discharge facilities presently owned or controlled by the discharger, the discharger shall notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to this office. To assume operation of this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. (Refer to Standard Provisions, referenced above). The request must contain the requesting entity's full legal name, the address and telephone number of the persons responsible for contact with the Board and statement. The statement shall comply with the signatory paragraph described in Standard Provisions and state that the new owner or operator assumes full responsibility for this Order. Failure to submit the request shall be considered a discharge without requirements, a violation

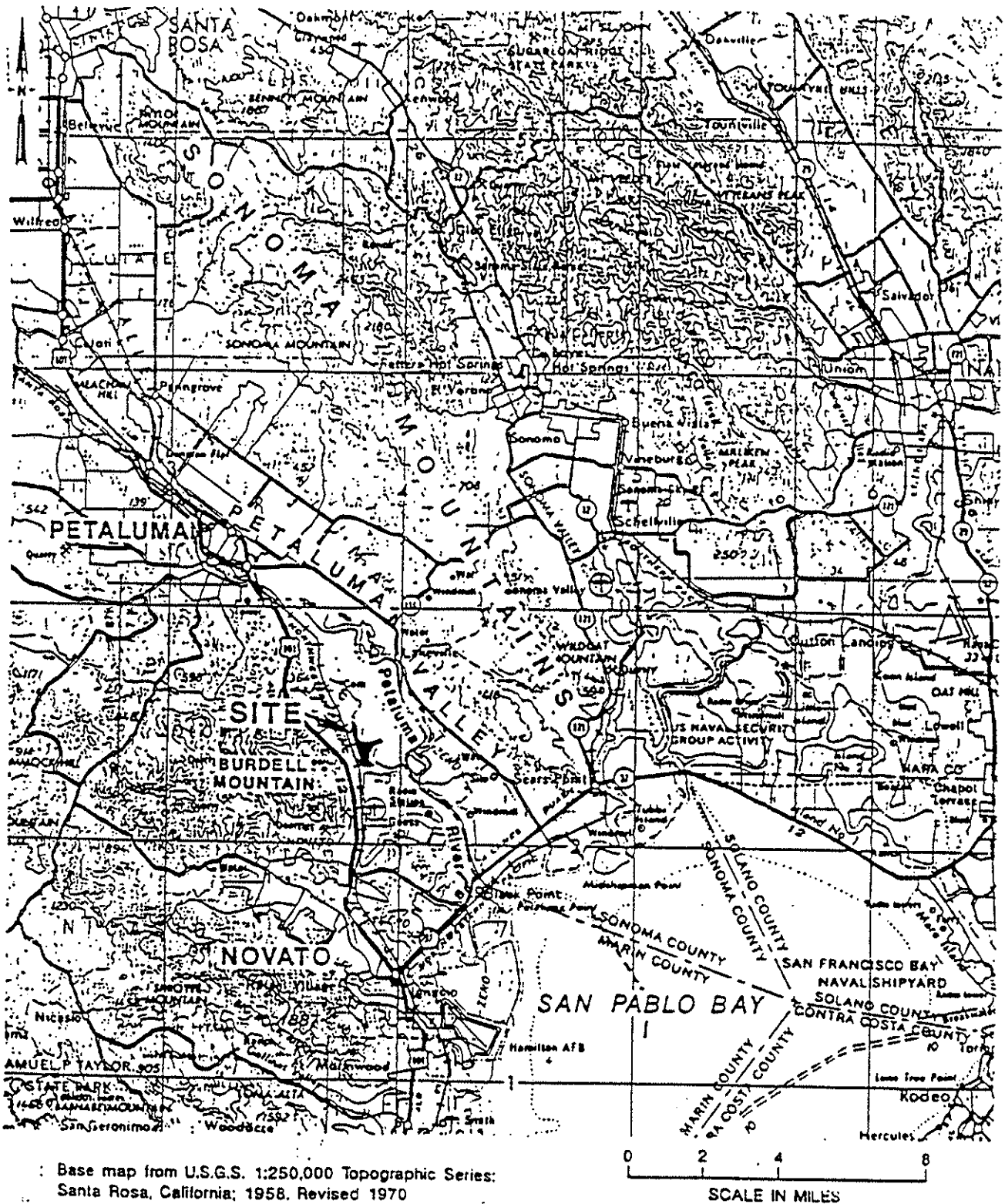
of the California Water Code.

19. This Order is subject to Board review and updating, as necessary, to comply with changing State and Federal laws, regulations, policies, or guidelines; changes in the Board's Basin Plan; or changes in the discharge characteristics.

I, Steven R. Ritchie, Executive Officer, do hereby certify that the foregoing is a full, complete, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on May 24, 1995.


Steven R. Ritchie
Executive Officer

Attachments: A. Site Location Map
 Figure 1 & 2. Facility Map
 Table 1, Summary of Slope Stability Analyses
 Discharge Monitoring Program



Harding Lawson Associates
Engineering and
Environmental Services

Site Location Map
Interim Self Monitoring Program
Second Quarter 1994 Report
Redwood Landfill
Novato, California

ATTACHMENT A

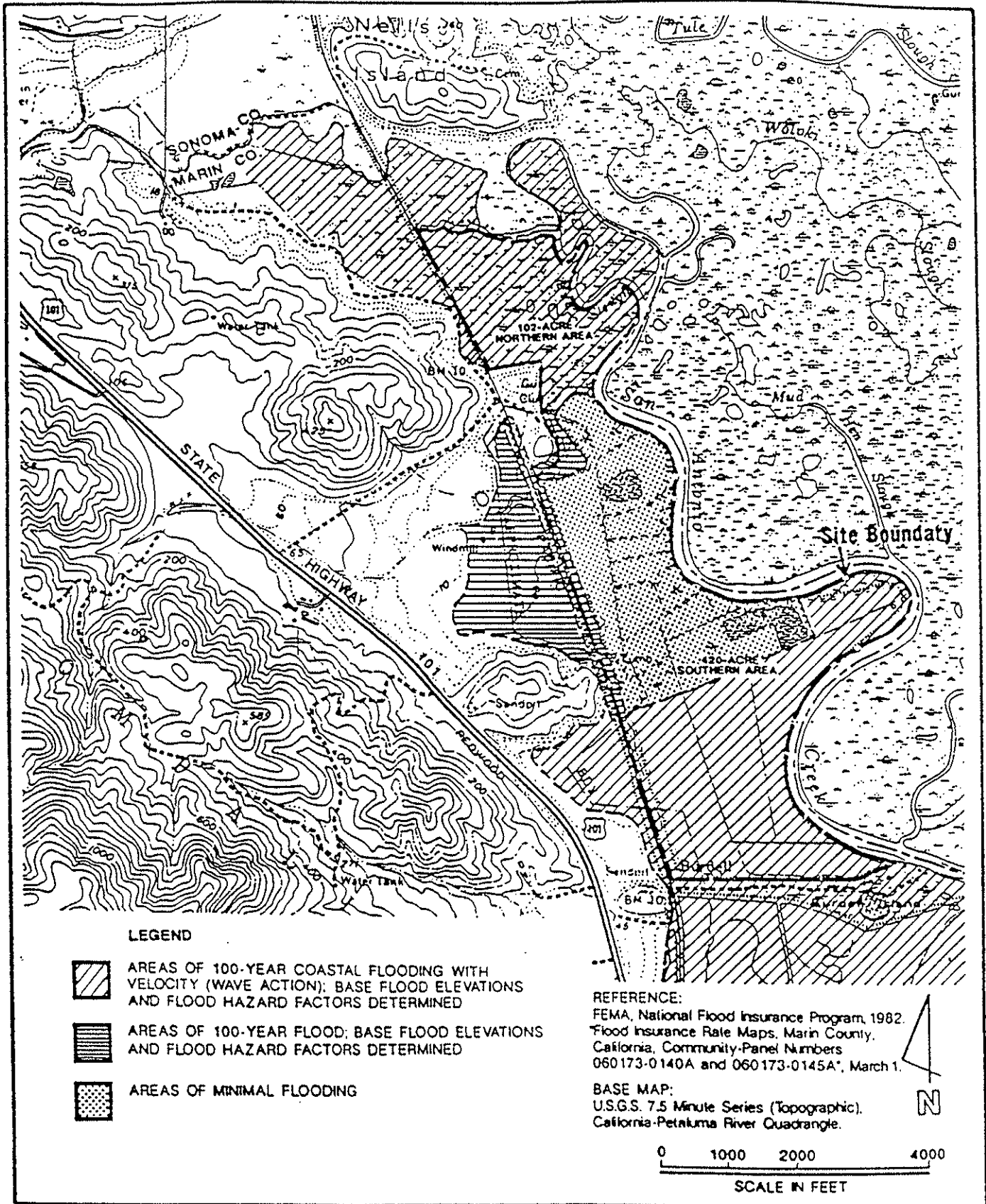
DRAWN JOB NUMBER
CSN 26143 322

APPROVED

C. Amies

DATE
7/94

REVISED DATE



Harding Lawson Associates
 Engineering and
 Environmental Services

100-Year Floodplain Map
 Redwood Landfill
 Marin County, California

Figure 2

DRAWN
 RS

JOB NUMBER
 22868 20303

APPROVED

DATE
 12/93

REVISED DATE

Redwood Landfill

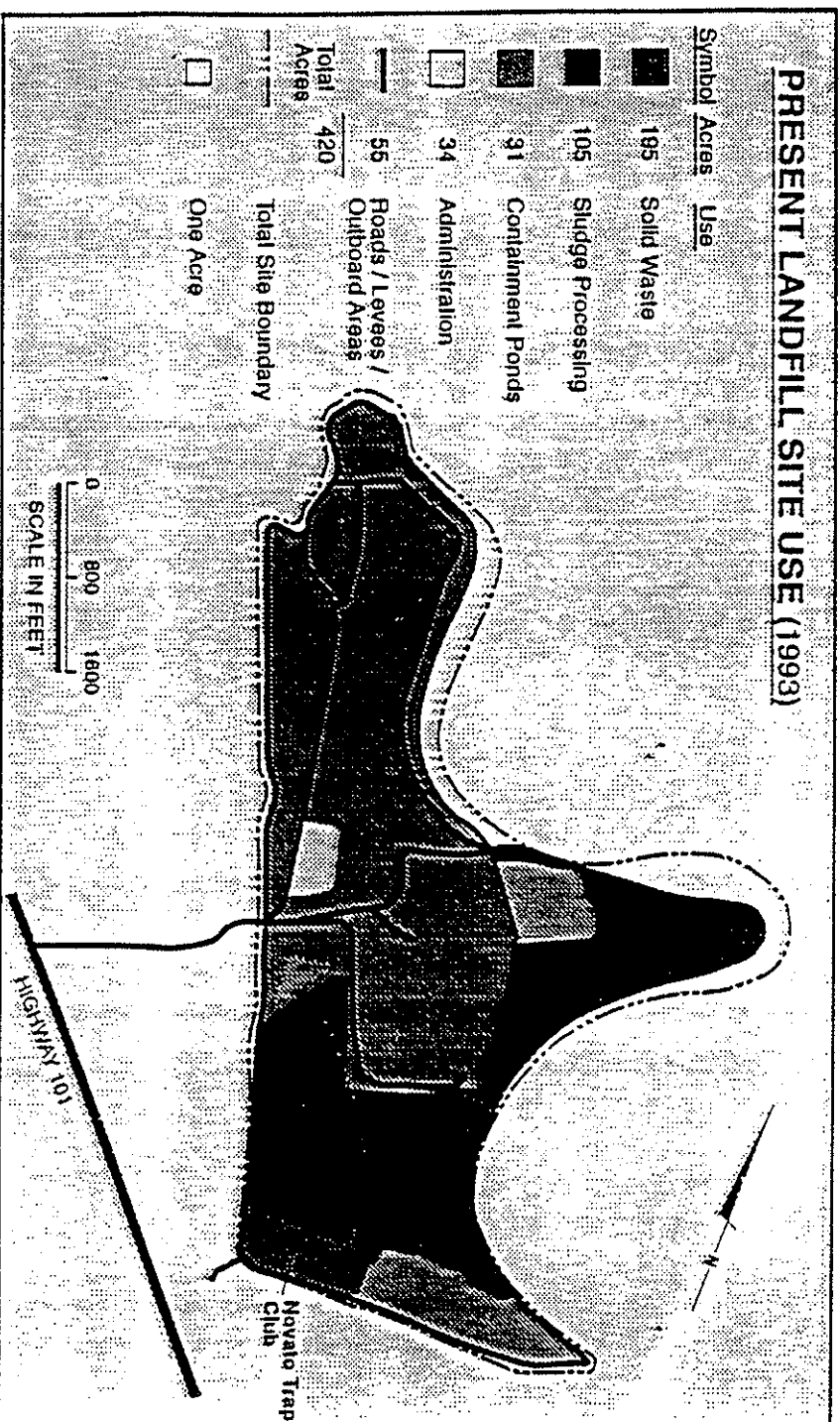


Figure 1

Table 1

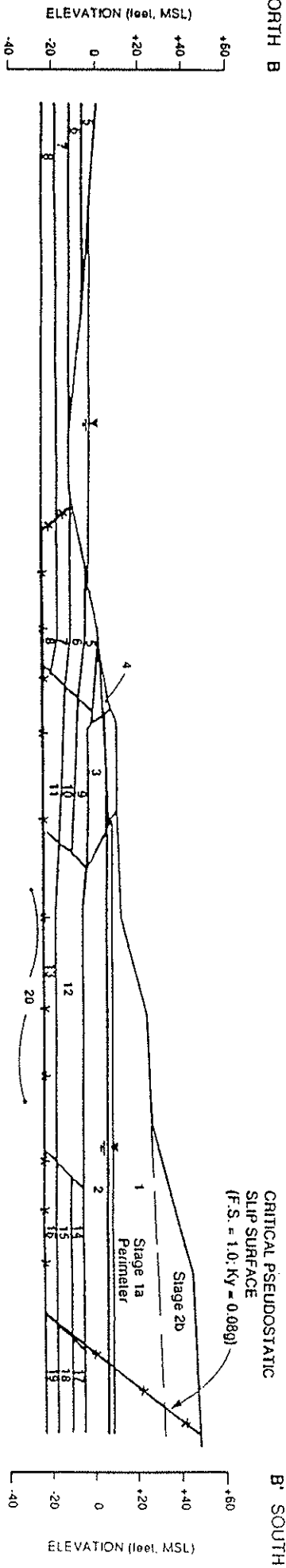
SECTION B-B: STAGE 2b: PSEUDOSTATIC ANALYSIS

ENGINEERING PROPERTIES					
LAYER NUMBER	LAYER DESCRIPTION	UNIT WEIGHT (pcf)	SATURATED UNIT WEIGHT (pcf)	UNDRAINED SHEAR STRENGTH OR COHESION (psf)	FRICTION ANGLE (DEGREES)
1	Future Refuse	80	105	800	20
2	20-Yr Old Refuse	60	90	800	20
3	New Levee Fill	115	120	2000	0
4	Old Levee Fill	93	105	800	0
5	Bay Mud	92	92	95	0
6	Bay Mud	92	92	140	0
7	Bay Mud	92	92	175	0
8	Bay Mud	92	92	215	0
9	Bay Mud	92	92	300	0
10	Bay Mud	92	92	350	0
11	Bay Mud	92	92	390	0
12	Bay Mud	92	92	405	0
13	Bay Mud	92	92	475	0
14	Bay Mud	92	92	550	0
15	Bay Mud	92	92	580	0
16	Bay Mud	92	92	540	0
17	Bay Mud	92	92	680	0
18	Bay Mud	92	92	700	0
19	Bay Mud	92	92	640	0
20	Alluvium	130	130	2000	0

* These strength values were calculated using Equation 1 and applying anisotropy corrections (Section 5.5.3.3).

FILL SEQUENCING SCHEDULE		
STAGE	START DATE	COMPLETION DATE
1b Perim	Apr-94	Nov-94
2b	Dec-04	Dec-05

- Notes:
1. In ICON, refuse loads are applied at the completion date for a given stage of filling.
 2. Bay Mud undrained shear strengths are calculated at the start date for the stage being analyzed.
 3. Refuse grades in setback areas and at the top of the stage being analyzed are sloped at 4 percent for drainage; refuse slopes are inclined at 4:1 (horizontal: vertical); the grades shown include final cover.
 4. Stage areas are shown on the fill sequencing drawings.



SCALE 1" = 50'

Harding Lawson Associates
Engineering and Environmental Services

Section B-B' (Stage 2b)
Pseudostatic Slope Stability Results
Redwood Landfill
Marin County, California

DRAWN: AG
JOB NUMBER: 301.088.04
APPROVED: [Signature]
DATE: 5/92
REVISIO DATE:

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

DISCHARGE MONITORING PROGRAM

FOR

REDWOOD SANITARY LANDFILL, INC.
REDWOOD LANDFILL
CLASS III LANDFILL WASTE MANAGEMENT UNIT
NOVATO, MARIN COUNTY

ORDER NO. 95-110

CONSISTS OF

PART A

AND

PART B

PART A

A. GENERAL

Reporting responsibilities of waste dischargers are specified in Sections 13225(a), 13267(b), 13383, and 13387(b) of the California Water Code and this Regional Board's Resolution No.73-16. This Discharge Monitoring Program is issued in accordance with Provision C.9 of Regional Board Order No. 95-110.

The principal purposes of a discharge monitoring program are:

- (1) to document compliance with waste discharge requirements and prohibitions established by the Board,
- (2) to facilitate self-policing by the waste discharger in the prevention and abatement of pollution arising from waste discharge,
- (3) to develop or assist in the development of standards of performance, and toxicity standards,
- (4) to assist the discharger in complying with the requirements of Article 5, Chapter 15 as revised July 1, 1991.

B. SAMPLING AND ANALYTICAL METHODS

Before each sampling event (e.g. quarterly or semi-annual sampling) each member of the field team must sign a document stating that he/she has read and understands the current version of the sampling and analysis plan (SAP). A copy of this document must be submitted to the Board with the report of analytical results.

Sample collection, storage, and analyses shall be performed according to the most recent version of EPA Standard Methods and in accordance with an approved sampling and analysis plan.

Water and waste analysis shall be performed by a laboratory approved for these analyses by the State of California. The director of the laboratory whose name appears on the certification shall supervise all analytical work in his/her laboratory and shall sign all reports of such work submitted to the Regional Board.

All monitoring instruments and equipment shall be properly calibrated and maintained to ensure accuracy of measurements.

C. DEFINITION OF TERMS

1. A grab sample is a discrete sample collected at any time.
2. Receiving waters refers to any surface water which actually or potentially receives surface or groundwaters which pass over, through, or under waste materials or contaminated soils. In this case the groundwater beneath and adjacent to the landfill areas, the surface runoff from the site, Spring Branch are considered receiving waters.
3. Standard observations refer to:
 - a. Receiving Waters
 - 1) Floating and suspended materials of waste origin: presence or absence, source, and size of affected area.
 - 2) Discoloration and turbidity: description of color, source, and size of affected area.
 - 3) Evidence of odors, presence or absence, characterization, source, and distance of travel from source.
 - 4) Evidence of beneficial use: presence of water associated wildlife.
 - 5) Flow rate.
 - 6) Weather conditions: wind direction and estimated velocity, total precipitation during the previous five days and on the day of observation.
 - b. Perimeter of the waste management unit.
 - 1) Evidence of liquid leaving or entering the waste management unit, estimated size of affected area and flow rate. (Show affected area on map)
 - 2) Evidence of odors, presence or absence, characterization, source, and distance of travel from source.
 - 3) Evidence of erosion and/or daylighted refuse.
 - c. The waste management unit.
 - 1) Evidence of ponded water at any point on the waste management facility.
 - 2) Evidence of odors, presence or absence, characterization, source, and distance of travel from source.
 - 3) Evidence of erosion and/or daylighted refuse.
 - 4) Standard Analysis (SA) and measurements are listed on Table A (attached)

D. SAMPLING, ANALYSIS, AND OBSERVATIONS

The discharger is required to perform sampling, analyses, and observations in the following media:

1. Groundwater per Section 2550.7(b) and
 2. Surface water per the site's General Industrial Stormwater Permit.
 3. Vadose zone per Section 2550.7(d). is not technically feasible for this site.
- and per applicable general requirements consistent with Redwood's Monitoring and Reporting Program (HLA, August 31, 1994), as specified in Section 2550.7(e) of Article 5, Chapter 15.

E. RECORDS TO BE MAINTAINED

Written reports shall be maintained by the discharger or laboratory, and shall be retained for a minimum of five years. This period of retention shall be extended during the course of any unresolved litigation regarding this discharge or when requested by the Board. Such records shall show the following for each sample:

1. Identity of sample and sample station number.
2. Date and time of sampling.
3. Date and time that analyses are started and completed, and name of the personnel performing the analyses.
4. Complete procedure used, including method of preserving the sample, and the identity and volumes of reagents used.
5. Calculation of results.
6. Results of analyses, and detection limits for each analysis.

F. REPORTS TO BE FILED WITH THE BOARD

1. Written detection monitoring reports shall be filed by the 15th day of the month following the report period. In addition an annual report shall be filed as indicated in F.3 below. The reports shall be comprised of the following:

- a. Letter of Transmittal

A letter transmitting the essential points in each report should accompany each report. Such a letter shall include a discussion of any requirement violations found during the

REDWOOD LF ORDER NO. 95-110
DISCHARGE MONITORING PROGRAM

last report period, and actions taken or planned for correcting the violations. If the discharger has previously submitted a detailed time schedule for correcting requirement violations, a reference to the correspondence transmitting such schedule will be satisfactory. If no violations have occurred in the last report period this shall be stated in the letter of transmittal. Monitoring reports and the letter transmitting the monitoring reports shall be signed by a principal executive officer at the level of vice president or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge originates. The letter shall contain a statement by the official, under penalty of perjury, that to the best of the signer's knowledge the report is true, complete, and correct.

- b. Each monitoring report shall include a compliance evaluation summary. The summary shall contain:
 - 1) A graphic description of the velocity and direction of groundwater flow under/around the waste management unit, based upon the past and present water level elevations and pertinent visual observations.
 - 2) The method and time of water level measurement, the type of pump used for purging, pump placement in the well; method of purging, pumping rate, equipment and methods used to monitor field pH, temperature, and conductivity during purging, calibration of the field equipment, results of the pH, temperature conductivity and turbidity testing, well recovery time, and method of disposing of the purge water.
 - 3) Type of pump used, pump placement for sampling, a detailed description of the sampling procedure; number and description of equipment, field and travel blanks; number and description of duplicate samples; type of sample containers and preservatives used, the date and time of sampling, the name and qualifications of the person actually taking the samples, and any other observations.
- c. A map or aerial photograph shall accompany each report showing observation and monitoring station locations.
- d. Laboratory statements of results of analyses specified in Part B must be included in each report. The director of the laboratory whose name appears on the laboratory certification shall supervise all analytical work in his/her laboratory and shall sign all reports

of such work submitted to the Board.

- 1) The methods of analyses and detection limits must be appropriate for the expected concentrations. Specific methods of analyses must be identified. If methods other than EPA approved methods or Standard Methods are used, the exact methodology must be submitted for review and approved by the Executive Officer prior to use.
- 2) In addition to the results of the analyses, laboratory quality assurance/quality control (QA/QC) information must be included in the monitoring report. The laboratory QA/QC information should include the method, equipment and analytical detection limits; the recovery rates; an explanation for any recovery rate that is less than 80%; the results of equipment and method blanks; the results of spiked and surrogate samples; the frequency of quality control analysis; and the name and qualifications of the person(s) performing the analyses.
- e. An evaluation of the effectiveness of the leachate monitoring or control facilities, which includes an evaluation of leachate buildup within the disposal units, a summary of leachate volumes removed from the units, and a discussion of the leachate disposal methods utilized.
- f. A summary and certification of completion of all standard observations for the waste management unit, the perimeter of the waste management unit, and the receiving waters.
- g. The quantity and types of wastes disposed of during the past quarter, and the locations of the disposal operations.

2. CONTINGENCY REPORTING

- a. A report shall be made by telephone of any seepage from the disposal area immediately after it is discovered. A written report shall be filed with the Board within five days thereafter. This report shall contain the following information:
 - 1) a map showing the location(s) of discharge;
 - 2) approximate flow rate;
 - 3) nature of effects; i.e. all pertinent observations and analyses; and
 - 4) corrective measures underway or proposed.

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DISCHARGE MONITORING PROGRAM

- b. A report shall be made in writing to the Board within seven days of determining that a statistically significant difference occurred between a down gradient sample and a WQPS. Notification shall indicate what WQPS(s) has/have been exceeded. The discharger shall immediately resample at the compliance point where this difference has been found and re-analyze.
- c. If resampling and analysis confirms the earlier finding of a statistically significant difference between monitoring results and WQPS(s) the discharger must submit to the Board an amended Report of Waste Discharge as specified in Section 2550.8(k)(5) for establishment of an Evaluation Monitoring Program (EMP) meeting the requirements of Section 2550.9 of Chapter 15.
- d. Within 180 days of determining statistically significant evidence of a release, submit to the regional board an engineering feasibility study for a Corrective Action Program (CAP) necessary to meet the requirements of Section 2550.10. At a minimum, the feasibility study shall contain a detailed description of the corrective action measures that could be taken to achieve background concentrations for all constituents of concern.

3. REPORTING

By January 31 of each year the discharger shall submit an annual report to the Board covering the previous calendar year. This report shall contain:

- a. Tabular and graphical summaries of the monitoring data obtained during the previous year; the report should be accompanied by a 5¹/₄" computer data disk, MS-DOS ASCII format, tabulating the year's data.
- b. A comprehensive discussion of the compliance record, and the corrective actions taken or planned which may be needed to bring the discharger into full compliance with the waste discharge requirements.
- c. A map showing the area, if any, in which filling has been completed during the previous calendar year.
- d. A written summary of the groundwater analyses indicating any change in the quality of the groundwater.
- e. An evaluation of the effectiveness of the leachate monitoring/ control facilities, which includes an

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evaluation of leachate buildup within the disposal units, a summary of leachate volumes removed from the units, and a discussion of the leachate disposal methods utilized.

4. WELL LOGS

A boring log and a monitoring well construction log shall be submitted for each sampling well established for this monitoring program, as well as a report of inspection or certification that each well has been constructed in accordance with the construction standards of the Department of Water Resources. These shall be submitted within 30 days after well installation.

Part B

1. DESCRIPTION OF OBSERVATION STATIONS AND SCHEDULE OF OBSERVATIONS

A. WASTE MONITORING - Report Quarterly

1. Record the total volume and weight of refuse in cubic yards and tons disposed of at the site during each month showing locations and dimensions on a sketch or map.
2. Record a description of waste stream to include percentage of waste type, ie., Residential, Commercial, Industrial or Construction debris and designated waste with the records of concentration limits accepted. The concentration limits for designated waste acceptable for disposal into the landfill are stated in Specification B.5. of the Waste Discharge Requirements.
3. Record location and aerial extent of disposal of each waste type.

B. ON-SITE OBSERVATIONS - Report Quarterly

STATION	DESCRIPTION	OBSERVATIONS	FREQUENCY
V-1 thru V-'n'	Located on the waste disposal area as delineated by a 500 foot grid network.	Standard observations for the waste management unit.	Weekly
P-1 thru P-'n' (perimeter)	Located at equidistant intervals not exceeding 1000 feet around the perimeter of the waste management unit.	Standard observations for the perimeter.	Weekly

C. GROUNDWATER MONITORING

Groundwater shall be monitored as outlined below and as detailed on Tables A and B (attached). Background monitoring will be conducted on a quarterly basis for new wells to approximate, as accurately as possible, the true range of ambient concentrations of compounds in the groundwater system being monitored (detailed below). Background data for new Bay Mud (channel deposit) wells will consist of eight sample points collected at quarterly intervals for two years. Background sampling will be conducted for those constituents listed in Table A, "Background Monitoring Parameters", of this Discharge Monitoring Program. New wells to be installed in the Bay Mud hydrostratigraphic unit are listed under Monitoring Points, Part B(1) of this Discharge Monitoring Program. The results of these analyses will be reported on a semi-annual basis concurrent with the existing well network (described below)..

Existing wells within the Bay Mud (channel deposits) will rely on the site's historic chemical database to approximate the true range of ambient concentrations of the targeted compounds. If sufficient background data has been collected (i.e., eight quarters over a two year period), monitoring will occur at a semi annual interval for the parameters listed in Table B-1, "Detection Monitoring Parameters, Bay Mud (channel Deposit) Hydrostratigraphic Unit". Otherwise, quarterly sampling will be performed as necessary to bring the total background database for each monitoring parameter to eight (minimum). Wells completed within the Alluvium hydrostratigraphic unit will be sampled at a bi-annual interval for the Detection Monitoring Parameters as listed in Table B-2. These observation points will be monitored for gross changes. However, upon detection of a statistically significant increase (i.e., accedence of a Water Quality Protection Standard) in a Bay Mud (channel Deposit) well, all of the alluvial wells at the site shall be sampled, regardless of the last sampling interval for the Alluvial unit.

The Detection Monitoring Parameters are selected based on their persistence in site leachate, mobility, and detectibility. The concentration ranges for the analytes listed in Table B indicate a distinct contrast between their occurrence in natural groundwater and

that of site leachate. Other typical leachate indicators are masked by the natural groundwater chemistry at the site.

Should background monitoring identify additional constituents which would be feasible for detection monitoring, these parameters will be added to the detection monitoring parameter list. Conversely, should any of the existing Detection Monitoring Parameters (Table B) be determined as infeasible for monitoring, they may be deleted from the Detection Monitoring Parameter List.

Samples will be collected from two leachate wells annually. The leachate monitoring points identified in Part B(1) "Monitoring Points" will be rotated annually (i.e., two new leachate wells will be sampled each year). Leachate Samples will be analyzed annually for Parameters listed in Table C, "Leachate Monitoring Parameters", of the Discharge Monitoring Program and any additional parameters listed in Table A.

Intrawell comparisons using a control chart approach shall be used for statistical evaluation of data collected from sand/silty sand (bay mud) and alluvial wells as proposed by discharger (each well is used as it's own background). Statistical evaluation methods are described in detail in the site's approved Monitoring and Reporting Program (HLA, August 31, 1994).

Monitoring Points:

Bay Mud (Sand/Silty Sand Channel Deposits)

<u>Well No.</u>	<u>Frequency</u>
P2	Semi-annual
MWH-18	Semi-annual
P-17C	Semi-annual
MWH-08*	Quarterly (background)==> Semi-annual
MWH-09*	Quarterly (background)==> Semi-annual
MWH-19*	Quarterly (background)==> Semi-annual
MWH-21*	Quarterly (background)==> Semi-annual

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MWH-24*

Quarterly (background) ==> Semi-annual

Alluvial Wells

<u>Well No.</u>	<u>Frequency</u>
P-5B	Bi-Annual
P-6B	Bi-Annual
P-10	Bi-Annual
MWH-25**	At Installation ==> Bi-annual

Leachate Wells

GR-1R	GR-5R
GR-2R	GR-6R
GR-3R	GR-7R
GR-4R	GR-8R

Notes:

- 1) Two leachate wells shall be sampled for COCs annually. Leachate monitoring locations shall be rotated each year as described in the "Proposed Monitoring and Reporting Program", (HLA 1994).
 - 2) Leachate elevations shall be obtained quarterly and reported semi-annually with groundwater monitoring reports.
 - 3) A minimum of eight independent samples from each new monitoring well must be collected and analyzed during the first two years at quarterly intervals.
- * Bay mud (sand/silty sand channel deposit) monitoring well to be installed. Wells will be sampled at quarterly intervals for two years until sufficient background information is collected.
- ** Alluvial monitoring well to be installed. Wells will be sampled at quarterly intervals for two years until sufficient background information is collected.

D. FACILITIES MONITORING

The Discharger shall inspect all facilities to ensure proper and safe operation once per quarter and report quarterly. The facilities to be monitored shall include, but not be limited to:

- a. Leachate Collection and Removal System

REDWOOD LF ORDER NO. 95-110
DISCHARGE MONITORING PROGRAM

- b. Surface water impoundment
- c. Leachate handling facilities
- d. Perimeter diversion channels
- e. Leachate Management facilities and secondary containment.

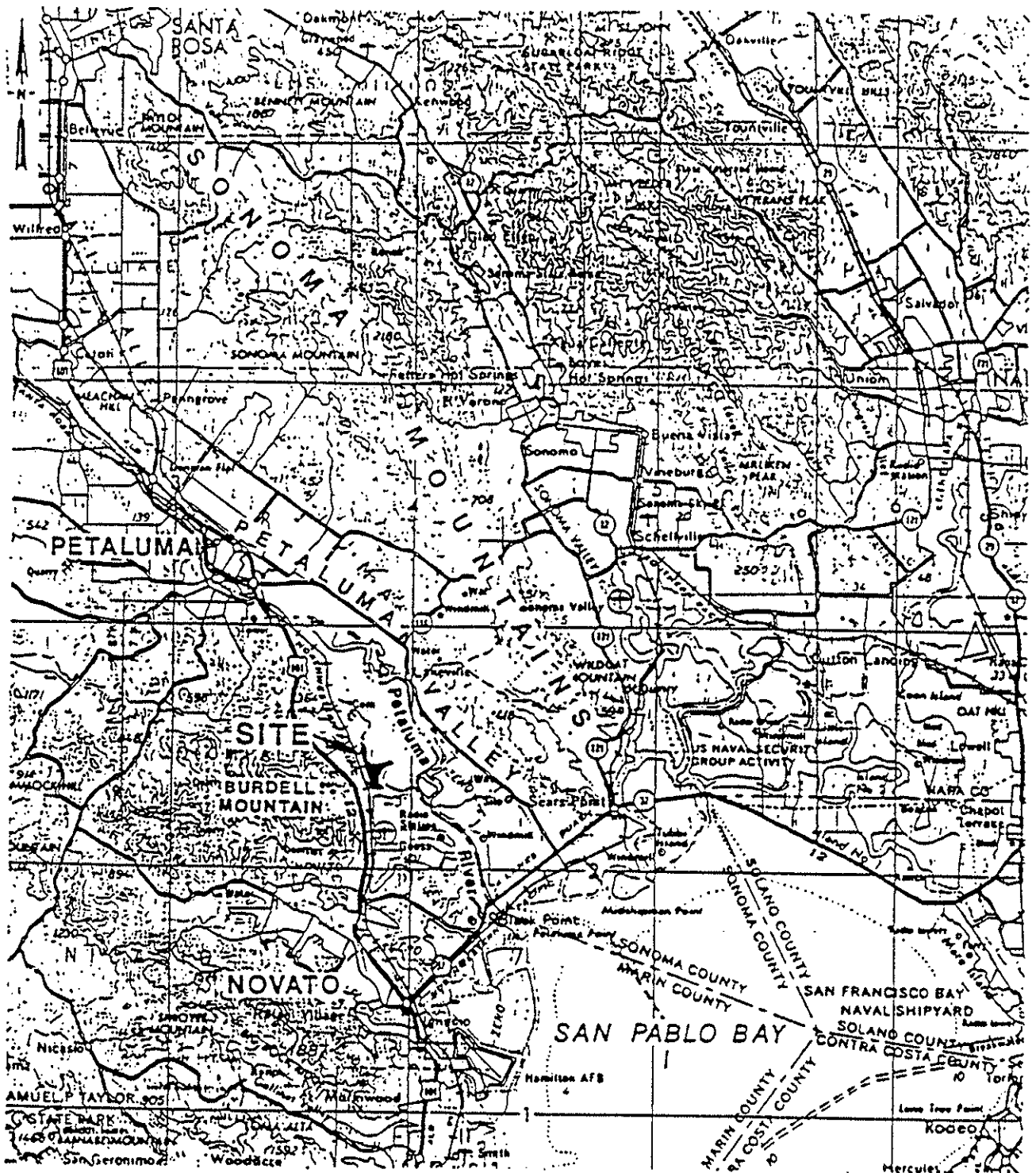
I, Steven R. Ritchie, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

- 1. Has been developed in accordance with the procedures set forth in this Board's Resolution No. 73-16 in order to obtain data and document compliance with waste discharge requirements established in this Board's Order No. 95-110
- 2. Is effective on the date shown below.
- 3. May be reviewed or modified at any time subsequent to the effective date, upon written notice from the Executive Officer.

 5/26/95
Steven R. Ritchie
Executive Officer

Date Ordered: May 24, 1995

Attachment: A - Site Map
 B - Monitoring Network
 Table A - Background Monitoring Parameters
 Table B(1) & B(2) - Detection Monitoring
 Parameters
 Table C - Leachate Monitoring Parameters



Base map from U.S.G.S. 1:250,000 Topographic Series:
Santa Rosa, California; 1958. Revised 1970

0 2 4 8
SCALE IN MILES

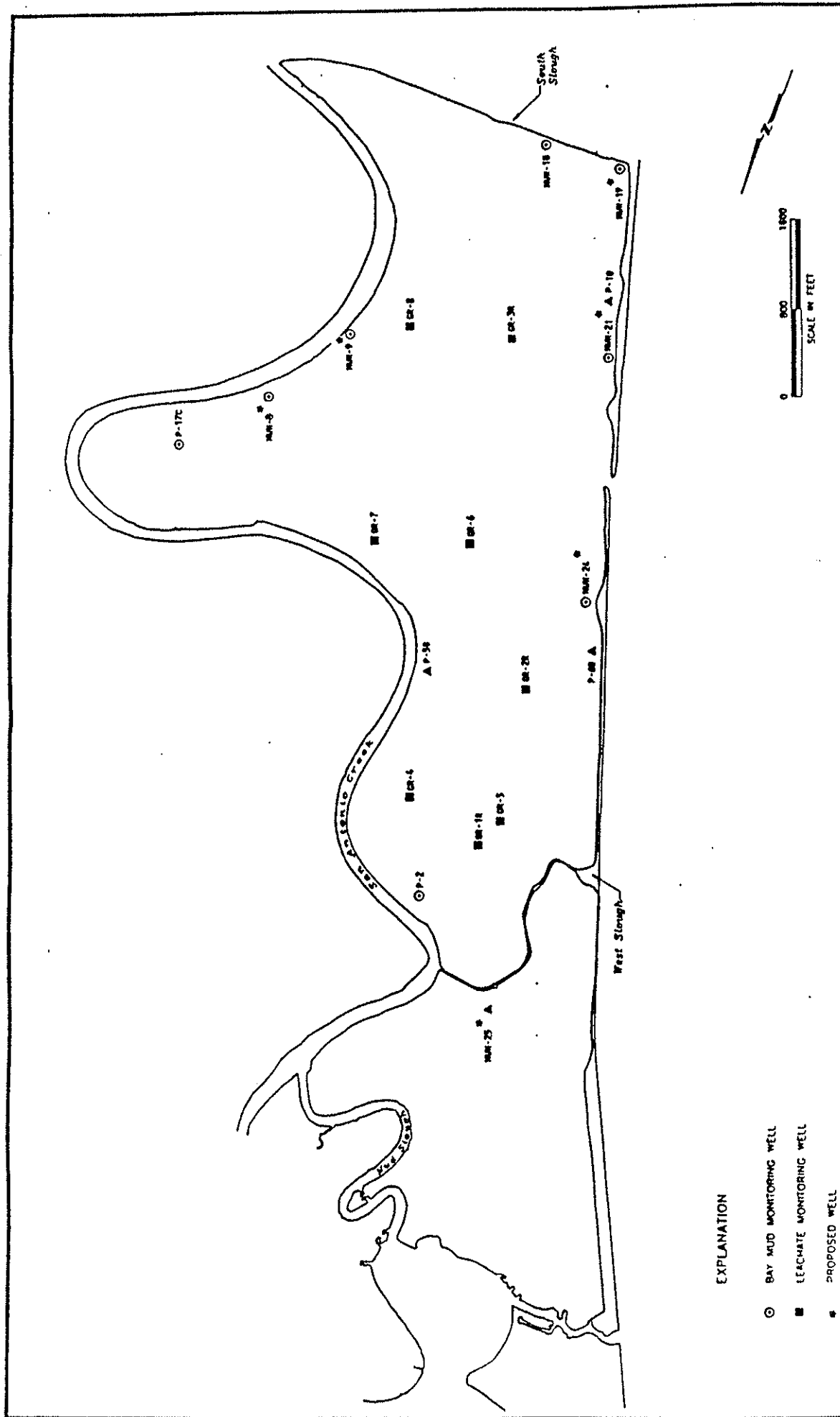


Harding Lawson Associates
Engineering and
Environmental Services

Site Location Map
Interim Self Monitoring Program
Second Quarter 1994 Report
Redwood Landfill
Novato, California


ATTACHMENT A

DRAWN	JOB NUMBER	APPROVED	DATE	REVISED DATE
CSN	26143 322	C. Amick	7/94	



EXPLANATION

- BAY MUD MONITORING WELL
- LEACHATE MONITORING WELL
- * PROPOSED WELL
- ▲ ALLUVIAL MONITORING WELL



Harding Lawson Associates, Inc.
Engineering and
Environmental Services

Proposed Monitoring Network
Reporting Program
Redwood Landfill
Norwalk, California

Drawn: J.S. Smith
Checked: J.S. Smith
Date: 8/94

22568.700

TABLE A:
Background Monitoring Parameters
Quarterly Frequency (2 yrs/8 sample points)

Bay Mud (Channel Deposit) Wells

PARAMETER	METHOD	FREQUENCY
Volatile Organic Compounds	8260	Quarterly
Antimony	6010	Quarterly
Arsenic	7060	Quarterly
Barium	6010	Quarterly
Beryllium	6010	Quarterly
Cobalt	6010	Quarterly
Cadmium	6010	Quarterly
Total Chromium	6010	Quarterly
Copper	6010	Quarterly
Lead	6010	Quarterly
Nickel	6010	Quarterly
Selenium	7740	Quarterly
Silver	6010	Quarterly
Iron	6010	Quarterly
Sodium	6010	Quarterly
Magnesium	6010	Quarterly
Potassium	6010	Quarterly
Calcium	6010	Quarterly
Chloride	6010	Quarterly
Carbonate	310.1	Quarterly

Bi-Carbonate	310.1	Quarterly
Sulfate		Quarterly
Total Dissolved Solids	160.1	Quarterly
Total Organic Carbon	415.1	Quarterly
Total Alkalinity	310.1	Quarterly
Total Kjeldahl Nitrogen	351.2	Quarterly
Nitrate-Nitrogen	351.4	Quarterly
Nitrate-Ammonia	351.2	Quarterly
ph	Field/9040	Quarterly
Temperature	Field	Quarterly
Turbidity	Field	Quarterly
Electrical Conductivity	Field/	Quarterly

Notes:

- A) Appendix I Metals to be filtered and unfiltered at least once.
- B) Eight Background sample data points will be collected from each new Bay Mud monitoring wells will use acceptable historical chemical data. Background data will be collected for new wells subsequent to installation over quarterly intervals for two years.

TABLE B(1):
Detection Monitoring Parameters
Semi Annual Frequency
Bay Mud (Channel Deposit) Wells

PARAMETER	METHOD	FREQUENCY
Volatile Organic Compounds	8260	Semi-Annual
Total Organic Carbon	415.1	Semi-Annual
Total Kjeldahl Nitrogen	351.4	Semi-Annual
Iron	6010	Semi-Annual
ph	Field/9040	Semi-Annual
Electrical Conductivity	Field/Lab	Semi-Annual
Temperature	Field	Semi-Annual
Turbidity	Field	Semi-Annual
Groundwater surface Elev.	Field	Semi-Annual

Notes:

- A) Should background monitoring identify additional constituents which would be feasible for detection monitoring, these parameters will be added to the detection monitoring parameter list.

TABLE B(2):
Detection Monitoring Parameters
Bi-Annual Frequency
Alluvium Stratigraphic Unit Wells

PARAMETER	METHOD	FREQUENCY
Volatile Organic Compounds	8260	Bi-Annual
Total Organic Carbon	415.1	Bi-Annual
Total Kjeldahl Nitrogen	351.4	Bi-Annual
Iron	6010	Bi-Annual
ph	Field/9040	Bi-Annual
Electrical Conductivity	Field/Lab	Bi-Annual
Temperature	Field	Bi-Annual
Turbidity	Field	Bi-Annual
Groundwater surface Elev.	Field	Bi-Annual

TABLE C
Leachate Monitoring Parameters
Bi-Annual Frequency

- 1) Subtitle D, Appendix II Parameters
- 2) Any Additional parameters as listed in Table A.